

AMENDMENTS TO THE CLAIMS

1. (Previously Presented) An apparatus comprising:
 - a first reaction chamber;
 - a gas source coupled to the first reaction chamber to supply a nitrogen gas to the first reaction chamber;
 - an excitation energy source coupled to the first reaction chamber to generate a nitrogen plasma comprising nitrogen ions and radicals from the nitrogen gas; and
 - a second reaction chamber adapted to house a substrate for film formation at a site in the second reaction chamber,wherein the first reaction chamber is coupled to the second reaction chamber and separated from the substrate site by a distance equivalent to the lifetime of the nitrogen ions at a plasma generation rate such that the radicals react with the substrate in a film conversion step.
2. (Original) The apparatus of claim 1, wherein the excitation energy source supplies energy having a microwave frequency to generate a plasma from a gas.
3. (Original) The apparatus of claim 1, wherein the second reaction chamber is electrically non-biased.
4. (Original) The apparatus of claim 1, wherein the first reaction chamber is adapted to generate a nitrogen plasma, and the dimensions of the first reaction chamber are configured such that substantially all of the ions generated by the plasma are changed from an ionic state to a charge neutral state within the first reaction chamber.
5. (Original) The apparatus of claim 1, wherein the second reaction chamber is a rapid thermal processing chamber.
6. (Previously Presented) An apparatus for exposing a substrate to plasma, comprising:
 - a first reaction chamber;
 - means for supplying a nitrogen gas to the first reaction chamber;
 - means for generating a plasma from the nitrogen gas, the plasma comprising ions and radicals;
 - a second reaction chamber having means for housing a substrate for film formation processing; and

means for providing the plasma to the second reaction chamber substantially free of nitrogen ions such that the nitrogen radicals react with a substrate in a process conversion step.

7. (Original) The apparatus of claim 6, wherein the means for supplying a plasma comprises means for converting the gas to a plasma in the first reaction chamber.
8. (Withdrawn) A method of forming a plasma of radicals in a chamber, comprising:
generating a plasma comprising ions and radicals in a first chamber;
placing a substrate in a second chamber; and
transferring the plasma into the second chamber to react with the substrate substantially free of ions.
9. (Withdrawn) The method of claim 8, wherein the substrate has a surface containing an oxide and the plasma is a nitrogen plasma, the method comprising:
reacting the radicals with the oxide.
10. (Withdrawn) The method of claim 8, wherein prior to the step of transferring the radicals, the method further comprises the step of changing substantially all of the ions from an ionic stage to a neutral state.
11. (Withdrawn) A method of nitridizing an oxide, comprising:
generating a plasma comprising ions and radicals in a first chamber;
placing a substrate having an oxide layer on a surface in a second chamber;
transferring the radicals of the plasma into the second chamber substantially free of ions;
reacting a portion of the oxide layer and a portion of the plasma; and
nitridizing a portion of the oxide layer of the substrate.
12. (Withdrawn) The method of claim 11, wherein the step of reacting the oxide and the plasma includes reacting the radicals with the oxide to form one of a silicon nitride molecule and a silicon oxynitride molecule.
13. (Withdrawn) The method of claim 11, wherein the step of nitridizing a portion of the oxide layer includes nitridizing an exposed surface of the oxide layer.
14. (Withdrawn) A method of forming a nitrogen containing material in the presence of an oxide, comprising:

generating a plasma comprising ions and radicals in a first chamber;
placing a silicon wafer having an oxide in a second chamber;
removing substantially all of the ions from the plasma;
transferring the radicals of the plasma into the second chamber;
reacting a portion of the oxide and a portion of the plasma; and
forming a nitrogen containing material in a portion of the oxide layer of the substrate.

15. (Withdrawn) The method of claim 14, wherein the step of forming a nitrogen containing material includes forming one of a silicon nitride and a silicon oxynitride.

16. (Withdrawn) The method of claim 14, wherein the nitrogen containing material is formed in an exposed surface of the oxide layer.

17. (Previously Presented) A system for reacting a plasma with a substrate, comprising:
a first chamber;
a nitrogen gas source coupled to the first chamber comprising constituents adapted to react with a substrate;
an energy source coupled to the first chamber;
a second chamber configured to house a substrate for film formation processing;
a system controller configured to control the introduction of a nitrogen gas from the nitrogen gas source into the first chamber and to control the introduction of an energy from the energy source; and
a memory coupled to the controller comprising a computer-readable medium having a computer-readable program embodied therein for directing operation of the system, the computer-readable program comprising:
instructions for controlling the nitrogen gas source and the energy source to convert a portion of a nitrogen gas supplied by the gas source into a plasma comprising nitrogen ions and radicals,
wherein the first reaction chamber is separated from the second reaction chamber by a distance equivalent to the lifetime of the nitrogen ions at a plasma generation rate such that the radicals react with a substrate in the second chamber in a film conversion step.

18. (Original) The system of claim 17, wherein the dimensions of the first chamber are configured such that substantially all of the ions generated in the plasma are changed from an ionic state to a charge neutral state in the first chamber.

09/298,064

19. (Cancelled)

20. (Previously Presented) A machine readable storage medium containing executable program instructions which when executed cause a digital processing system to perform a method of reacting a plasma with a substrate, comprising:

generating a plasma from nitrogen comprising radicals and nitrogen ions in a first chamber;
and

transferring the plasma radicals via a distance equivalent to the lifetime of the nitrogen ions into a second chamber substantially free of ions.